SYSTEMS AND METHODS FOR PROCESSING AND MANAGING COLLOCATION APPLICATIONS OVER A COMPUTER NETWORK

Field of the Invention

5   The invention generally relates to the field of telecommunications. The invention particularly relates to systems and methods for processing and managing applications for collocation space over a computer network.

Background of the Invention

10   In the United States, telephone service was historically provided almost exclusively by American Telephone and Telegraph, Inc. (AT&T). Following deregulation of the telephone industry in 1984, AT&T was limited to providing long distance telephone service, and local telephone service was thereafter provided by the Regional Bell Operating Companies (RBOCs), such as Bell Atlantic and BellSouth. Thus, following deregulation, the

15   RBOCs served as the exclusive local exchange carriers (LECs), and maintained the subscriber loop between the Public Switched Telephone Network (PSTN) and each individual telephone subscriber.

In 1996, Congress enacted the Telecommunications Act (the "Act") as part of an effort to foster competition in the local telephone industry. Interpretations and enforcement

20   of key portions of the Act were placed in the jurisdiction of the Federal Communications Commission (FCC). The FCC quickly set forth regulations requiring incumbent local exchange carriers (ILECs) to allow any requesting telecommunications carriers, or competitive local exchange carriers (CLECs), to utilize the ILEC's networks to establish a market presence in a region while the CLEC builds its own physical network. These

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regulations require ILECs to make their network components available using a variety of approaches in which a CLEC purchases service bundles or individual service components from the ILEC and resells those services, as originally bundled, as rebundled by the CLEC or individually, to the CLEC's customers.

5　　　　The FCC required ILECs to offer collocation space, in some form, to CLECs as early as 1991, but the Act redefined collocation space requirements. As part of the Act's mandate, an ILEC must allow CLECs access to the ILEC's central offices (COs) and provide space in those COs, known as collocation space, for CLEC equipment. A CLEC, for example, may lease certain unbundled elements of the ILEC's network at reduced rates for resale. The

10　CLEC may lease an unbundled port on an end office switch as a point of access to the ILEC's switch and the subscriber loops. The CLEC then connects its own switch network to the unbundled port. Alternatively, the CLEC may operate its own independent switching facilities and loop plant. In either case, the regulatory requirements mandate that the CLEC facilities must be integrated into the PSTN in a seamless manner from the customer's

15　perspective. As such, customers must be able to make and receive telephone calls using existing dialing patterns, without any apparent distinction in processing as a result of service through the CLEC. The regulatory environment therefore places certain burdens on the ILEC to provide an efficient interconnection to the CLEC's facilities and to provide mechanisms for compensation between the parties for calls interconnected between the two

20　carriers' networks.

The interconnection contemplated by the Act provides nondiscriminatory access or interconnection to such services or information as is necessary to allow the requesting CLEC to implement local dialing parity, including access to telephone numbers, operator service,

directory assistance, and directory listing, with no unreasonable dialing delays. Federal regulations require that ILECs provide CLECs with a way to request these services as well as the necessary collocation space in the ILEC's CO. For instance, if there is a CO in which a CLEC wants to locate its equipment, the CLEC must complete an application for collocation

5   space and specific federal rules and regulations mandate how and when the ILEC must respond. Among the federal regulations are specified time limits or intervals for standard work activities such as the interval from application submit date to ILEC response date. These time limits may be as short as a few days, such that even a one day delay can become significant.

Previously, a CLEC completed a paper collocation application and sent the completed

10   application by mail, fax, or e-mail to an account team of the ILEC. If there were errors made by the CLEC in submitting the request, the account team was responsible for contacting the CLEC to verify and/or correct the information. The account team then sent the application to applicable field organizations or groups of the ILEC. Copies of applications had to be faxed

15   or shipped next-day air to multiple sites in the region in order to meet the regulatory mandated date intervals. Because there were so many applications being handled manually, applications were often lost or misplaced and an arduous tracking process had to be implemented to ensure proper handling.

Each applicable field group was responsible for providing any information required of

20   it, based on the collocation application, and entering the necessary data into a simple spreadsheet or on paper. The collective information provided by all of the applicable field groups formed the basis for a response to the CLEC. Once the ILEC sent a response, the CLEC replied by paper with a firm order if it wished to order the allocated collocation space.

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The paper process is faulty for numerous reasons, including time delays, poor handwriting, inaccurate math, and impossible or inconsistent data parameters entered by the CLEC.

The manual, paper-based environment was improved somewhat through the use of PCs and spreadsheets that multiple field groups could access. However, variations still exist because numerous parties are involved in the process and the information is spread among many PCs and is not centrally located. High employee turnover is another problem for CLECs. Because of the high volume of turnover, CLECs do not know with certainty whether a collocation application was sent, what attachments may have been included with the application, where copies of relevant documents were filed, etc. The manual, paper-based and spreadsheet-based systems and methods are simply too labor intensive and prone to errors.

Therefore, there is a need for methods and systems of automating the collocation application process using a computer network where applications for collocation space are processed, responses are generated, firm orders are submitted, and work is provisioned efficiently and accurately.

Summary of the Invention

The present invention satisfies the above-described needs by providing a method and system of processing and managing applications for collocation space. In a computer network including at least a workstation, a communications link, a secure web server, an application server, and a database server, an exemplary embodiment of the invention assists users or CLECs in completing applications for collocation space and allows ILECs to efficiently manage preparation of responses to those applications. Generally, an embodiment

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of the invention includes completion and submission of an application, and subsequent firm order, by a user to notify the ILEC that the user would like to collocate in a particular CO and processing of the application and firm order provisioning by the ILEC, including preparation of a response to the user indicating cost, space available, and other parameters.

5   An embodiment of the present invention assists users in submission of a collocation application. The user submits information regarding the location of the collocation space, the equipment to be installed, and other parameters. Some data field values in the application are automatically populated when the application is created based on the information provided by the user, or corresponding data, and calculations. The user may also provide a proposed layout of the equipment for the collocation space. Once the application is complete, the user submits the application. A validation check of the application determines whether the information provided by the user is accurate and complete. If the user has submitted invalid or incomplete information, the user receives an error message that advises the user of the error and its location in the application. Multiple errors may be covered by the same error message. After correcting any errors, the user re-submits the application, and receives a confirmation banner with the system assigned reference code. The ILEC is notified that the application was successfully submitted.

Another embodiment of the present invention includes managing collocation applications once they have been submitted and generating responses to those applications.

20   An exemplary workbook with a plurality of sections is created for each submitted application once the application is initially reviewed by the ILEC. Applicable field groups of the ILEC are responsible for completing the appropriate sections. As one group finishes, notification, including all of the relevant information that the next group needs to move forward with the

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response, is provided to the next group. This saves a significant amount of time in processing applications and results in more due dates being met. Much of the detailed information from the application may be used by the system to set field values when the workbook is created. This minimizes transpositions and inaccuracies and also allows for

5   validation of the information input into the workbook by the ILEC field groups. The workbook may also include a critical dates section to inform the ILEC and/or user of due dates and event dates. Once a response is complete, the user is notified and prompted to submit a firm order.

Advantages of systems and methods according to the present invention include

10   allowing ILECs to speed internal distribution, to respond to applications within the intervals mandated by the various regulatory bodies (FCC and state commissions), to improve reporting capabilities, and to reduce costs. These and other objects, features, and advantages of the present invention may be more clearly understood and appreciated from a review of the following detailed description of the disclosed embodiments and by reference to the

15   appended drawings.

Brief Description of the Drawings

The drawings include material that is subject to copyright protection. The copyright owner has no objection to the facsimile reproduction of the published patent document or

20   patent disclosure as it appears in the Patent and Trademark Office records, but otherwise reserves all copyrights in the material.

Fig. 1 illustrates an exemplary environment of a system according to the present invention.

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Fig. 2 is an exemplary screen shot of a user login page.

Fig. 3 is an exemplary screen shot illustrating a user administration menu.

Fig. 4 is an exemplary screen shot illustrating a screen where a user can change a password.

Fig. 5 is an exemplary screen shot illustrating a screen where a user can change a company code.

Fig. 6 is an exemplary screen shot illustrating a screen where a user can unlock a reference code.

Fig. 7 is an exemplary screen shot illustrating a worklist screen from a user perspective.

Fig. 8 is an exemplary screen shot illustrating a worklist screen from the ILEC ATCC perspective.

Fig. 9 is an exemplary screen shot illustrating a worklist screen from an ILEC field group perspective.

Fig. 10 is an exemplary screen shot depicting sections 1-3 of an exemplary collocation application.

Fig. 11 is an exemplary screen shot depicting sections 4 and 5 of an exemplary collocation application.

Fig. 12 is an exemplary screen shot depicting section 5 of an exemplary collocation application.

Fig. 13 is an exemplary screen shot depicting section 6 of an exemplary collocation application.

Fig. 14 is an exemplary screen shot depicting the first part of section 7 of an exemplary collocation application.

Fig. 15 is an exemplary screen shot depicting the second part of section 7 of an exemplary collocation application.

Fig. 16 is an exemplary screen shot depicting the first part of section 8 of an exemplary collocation application.

Fig. 17 is an exemplary screen shot depicting the second part of section 8 and section 9 of an exemplary collocation application.

Fig. 18 is an exemplary screen shot depicting the first part of section 10 of an exemplary collocation application.

Fig. 19 is an exemplary screen shot depicting the second part of section 10 and section 11 of an exemplary collocation application.

Fig. 20 is an exemplary screen shot depicting the first part of section 12 of an exemplary collocation application.

Fig. 21 is an exemplary screen shot depicting the second part of section 12 and section 13 of an exemplary collocation application.

Fig. 22 is an exemplary screen shot depicting section 14 of an exemplary collocation application.

Fig. 23 is an exemplary screen shot depicting section 15 of an exemplary collocation application.

Fig. 24 is an exemplary screen shot depicting a screen of an exemplary collocation application where a user may attach a file.

Fig. 25 is an exemplary screen shot depicting a screen of an exemplary collocation application where a user is notified of an error.

Fig. 26 is an exemplary screen shot depicting a confirmation screen of an exemplary collocation application.

Fig. 27 is an exemplary screen shot depicting section 1 of an exemplary revision of a collocation application.

Fig. 28 is an exemplary screen shot depicting sections 2 and 3 of an exemplary augment application of a collocation application.

Fig. 29 is an exemplary screen shot illustrating section 1 of an exemplary collocation application created from an existing application.

Fig. 30 is an exemplary screen shot illustrating sections 2 and 3 of an exemplary collocation application created from an existing application.

Fig. 31 is an exemplary screen shot showing application status history.

Fig. 32 is an exemplary screen shot illustrating an exemplary workbook summary.

Fig. 33 is an exemplary screen shot illustrating a screen where a file may be attached to an exemplary workbook.

Fig. 34 is an exemplary screen shot illustrating an exemplary Reference section of an exemplary workbook.

Fig. 35 is an exemplary screen shot illustrating an exemplary Reference section of an exemplary workbook.

Fig. 36 is an exemplary screen shot illustrating an exemplary Space Availability section of an exemplary workbook.

Fig. 37 is an exemplary screen shot showing an exemplary Customer Inquiry Response.

Fig. 38 is an exemplary screen shot showing an exemplary Customer Inquiry Response.

5 Fig. 39 is an exemplary screen shot showing an exemplary Customer Inquiry Response.

Fig. 40 is an exemplary screen shot depicting an exemplary PCM section of an exemplary workbook.

Fig. 41 is an exemplary screen shot depicting an exemplary CO-Operations section of an exemplary workbook.

Fig. 42 is an exemplary screen shot depicting an exemplary INAC section of an exemplary workbook.

Fig. 43 is an exemplary screen shot depicting an exemplary CCM section of an exemplary workbook.

Fig. 44 is an exemplary screen shot showing an exemplary INAC page of an exemplary workbook.

Fig. 45 is an exemplary screen shot illustrating an exemplary Critical Dates section of an exemplary workbook.

Fig. 46 is an exemplary screen shot depicting an exemplary Firm Order form

20 Fig. 47 is an exemplary screen shot showing an exemplary billing screen.

Fig. 48 is an exemplary screen shot showing an exemplary billing screen.

Fig. 49 is an exemplary screen shot depicting an exemplary Firm Order True-up screen.

Fig. 50 is an exemplary screen shot depicting an exemplary Firm Order True-up screen.

Fig. 51 is an exemplary screen shot depicting an exemplary Firm Order True-up screen.

Fig. 52 is an exemplary screen shot showing an administration menu for a system administrator.

Fig. 53 is an exemplary screen shot depicting a profile maintenance menu screen.

Fig. 54 is an exemplary screen shot depicting a company profile maintenance screen.

Fig. 55 is an exemplary screen shot depicting an individual profile maintenance screen.

Fig. 56 is an exemplary screen shot depicting an individual profile maintenance screen.

Fig. 57 is an exemplary screen shot depicting an individual profile maintenance screen.

Fig. 58 is an exemplary screen shot of an application status screen.

Fig. 59 is an exemplary screen shot of an application status screen.

Fig. 60 is an exemplary screen shot of a critical dates screen.

Fig. 61 is an exemplary screen shot of a critical dates screen.

Fig. 62 is an exemplary screen shot of a critical dates screen.

Detailed Description of the Invention

The following detailed description utilizes a number of acronyms which are generally well known in the art or industry. While definitions are typically provided with the first

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instance of each acronym, for convenience, Table 1 below provides a list of the acronyms

and their respective definitions.

TABLE 1

ACRONYM	DEFINITION
ACNA	Access Carrier Name Abbreviation
ATCC	Account Team Collocation Coordinator
CCM	Circuit Capacity Management
CFA	Connecting Facility Assignment
CIR	Customer Inquiry Response
CLEC	Competitive Local Exchange Carrier
CLLI	Common Language Location Identifier
CO	Central Office
CRE&S	Corporate Real Estate and Services
CSCM	Common Systems Capacity Management
FCC	Federal Communications Commission
FO	Firm Order
HD	Heat Dissipation
ILEC	Incumbent Local Exchange Carrier
INAC	Interconnection Network Access Coordinator
LEC	Local Exchange Carrier
NEBS	National Electrical Building Systems
NECA	National Exchange Carrier Association
OSPE	Outside Plant Engineering
PA	Physical Application
PC	Personal Computer
PCM	Power Capacity Management
PM	Program Manager
PSTN	Public Switched Telephone Network
RBOC	Regional Bell Operating Company
SQM	Service Quality Measurement
VA	Virtual Application

5   I.   Overview

Systems and methods according to the invention allow users to submit applications

for collocation space and firm orders via a computer network, such as the Internet. As shown

in Fig. 1, an exemplary environment includes a computer network with a workstation 102

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connected to a secure web server 106 via Internet 104. Web server 106 is connected to an application server 108, which in turn is connected to a database server 110. Optionally, an administrator workstation 112 may be connected to database server 110 to assist in reporting or querying from the administrator or ILEC perspective. Additionally, the exemplary

5 environment may have interfaces to external systems, for example, inputs from contract and rates systems and outputs to service request and billing systems. Systems and methods according to this invention may include submitting and distributing collocation applications and firm orders online; allowing ILEC field personnel to respond to and monitor applications online throughout the response and provisioning process; providing notification to the ILEC

10 groups and users via e-mail of the events affecting each application; and displaying the current status of each application.

A worklist feature according to a system and method of the present invention allows users to view their stored applications for collocation space. Users may perform several tasks, including searching for applications, creating applications, checking the status of

15 applications, and editing or revising applications.

Systems and methods according to the invention may include a collocation application. To complete the application, users are prompted for information regarding the location of the collocation space, the equipment to be installed, and other parameters. Users provide the necessary information and submit the application. Some data field values in the

20 application may be automatically populated by the system when the application is created based on the information provided by the user, data retrieved in response to information provided by the user, and calculations. Users may also provide a proposed layout of the equipment for the collocation space. Once the application is complete, the user submits the

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application. A validation check of the application may be performed to determine whether the information provided by the user is accurate and complete. Online instructions and help topics may be provided to assist users in completing applications or firm orders.

Systems and methods according to the invention may also include a workbook or similar functionality that aids in the managing of collocation applications and preparation of responses thereto. An exemplary workbook may include multiple sections created for each applicable field group of the ILEC. As one group completes its section and any required tasks, notification is provided to the next group. This saves a significant amount of time in processing applications and results in more due dates being met. Much of the detailed information from the application may be used by the system to set data field values when the workbook is created. The workbook may also include a critical dates section to inform the ILEC and/or user of due dates and event dates. Once a response is complete, the user is notified and prompted to submit a firm order.

If a user submits a firm order, the ILEC completes the provisioning phase where it constructs the collocation space and tracks the progress of completing the project. Once construction of the space is complete, the user visits the CO to inspect the space. If satisfactory, the user accepts the space and billing begins. If necessary, reconciliation occurs where billing is adjusted to reflect the true environment, which may result if the physical characteristics of the CO collocation space differ significantly from assumptions made during the response process.

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II.   User Login and Administration

When users access the website, they are directed to a login screen, as shown in Fig. 2.

If the user is already registered, the user simply enters a user name and password to proceed.

If the user has not previously registered, the user contacts a Regional Collocation Manager

5   for assistance in obtaining a user name and password.   In an exemplary embodiment, the

user, once logged in, may choose from main menu options including Home, Admin, Help,

User Guide, and Log Off, as shown in Fig. 3.   The User Admin Menu allows the user to

change its password, change its company code, or unlock an application or firm order, as

shown in Fig. 3.   Additionally, in an exemplary embodiment, the user may update or

10   maintain its customer or company profile.

As shown in Fig. 4, users may change their passwords.   In an exemplary embodiment,

user passwords expire every sixty days, thus requiring users to enter new passwords

periodically.   Users may change company codes as shown in Fig. 5.   Some users may be

associated with multiple codes and may desire to switch to a different company code.   For

15   example, a user associated with a CLEC that has more than one company code may use this

page to change the active company without having to log off.   Each user has a default

company code that is the initial company code shown each time the user logs in.   Users

cannot view applications for more than one company code simultaneously.   A drop-down

menu allows the user to select a company code from a list of company codes associates with

20   the user in its collocation user profile.

As shown in Fig. 6, a user may unlock an application or firm order.   When a user

accesses an application or firm order document, the document is checked out to that user (by

the database on which the document is stored) such that two users may not modify a

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document at the same time. If the user exits the system without canceling, saving, or submitting the changes made to the document, the document remains checked out. The user who checked out the document or the system administrator may unlock it by entering the reference code and selecting "Clear Lock," as shown in Fig. 6.

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III.   Worklist

Fig. 7 shows an exemplary embodiment of a worklist screen. This screen is the user's home page once the user is logged into the system. In an exemplary embodiment, no applications are visible upon initial login by the user, and the user utilizes the "Search For" area to retrieve one or more or all applications. In another embodiment, all applications to which the user has access are visible upon login by the user, and the user can limit the number of applications by using the search function. As shown in Fig. 7, reference codes are assigned to each collocation application. In an exemplary embodiment, the reference code may incorporate information from the application to assist the user in knowing the location, type, and CLEC details for that application. As an example, the second reference code listed is AUBNALMA-PA-C11-103-01. "AUBNALMA" is the Common Language Location Identification (CLLI) code for the central office (CO) location where the user desires collocation space. In this example, "AUBN" represents the city Auburn, "AL" represents the State of Alabama, and "MA" represents Main, the CO location in Auburn, Alabama. There are thousands of CLLI codes representing the numerous COs across the United States. The National Exchange Carrier Association (NECA) #4 Tariff, which is incorporated herein by reference, contains a list of all CLLI codes.

The collocation application type is shown as "PA," indicating that a collocation application is a physical application. All of the applications listed in Fig. 7 are physical applications. "VA" indicates that a collocation application is a virtual application. An exemplary embodiment may also include application types such as "MA" for microwave application, "AA" for adjacent application, "RP" for remote terminal physical application, "RA" for remote terminal adjacent application, and so on.

A physical application (PA) is one in which the user's equipment is in a caged environment. Generally, equipment may be located in a caged or cageless environment. In a caged environment, all of the user's equipment is located in a secure room or cage with access available only by key or code. In a cageless environment, the user's equipment is located in a common area open to all other users and ILEC personnel. A virtual application (VA) is one in which the user's equipment is in a cageless environment. The user is not allowed physical access to the equipment in a VA, and the equipment is maintained by the ILEC.

"C11" represents the company code, or Access Carrier Name Abbreviation (ACNA), that is assigned by Telcordia™ to the particular CLEC or company, such as AT&T®, Sprint®, etc. The application number and version are indicated by "103-01." In an exemplary embodiment, a company's first collocation application is assigned the number "100," the next application is assigned "101," and so on. The initial version of an application is assigned "01" and as revisions are made, new version numbers ("02," "03," and so on) are assigned.

There are several areas of the worklist where users may perform different tasks. As shown in Fig. 7, an action area 120 allows users to view, revise or edit applications; view a

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workbook associated with an application; print and display printable versions of applications; and submit firm orders. Selecting the glasses icon displays a printable version of the application, while selecting "Firm Order" allows the user to submit a firm order for that application. Selecting "Edit" (not shown in Fig. 7) permits users to edit unsubmitted

5   applications, and "Revise" is available for users to revise applications that have already been submitted. Several of these functionalities are discussed in further detail below.

Selecting the workbook icon allows users to view the Customer Inquiry Response (CIR) section of the workbook for the application. As shown in Fig. 7, when the status of an application is changed to "App Bona Fide," a workbook for the application is created and a

10   workbook icon appears next to the reference code of the application from that point forward (unless the application is canceled). An exemplary embodiment of a workbook is discussed in further detail below with regard to Figs. 32-51.

A search area 122, as shown in Fig. 7, allows users to search for one or more applications based on criteria such as reference code, status, state, or CLLI. Other criteria,

15   such as ACNA or city, or application type may also be used. To view all applications to which the particular user has access, the user clears all fields and selects "Retrieve." A status area 124 shows the status of each application listed. As shown in Fig. 7, different status indicators include "App Bona Fide," "Space Accepted," "Space Response," and "Space Ready." Numerous other status indicators may be used, as would be understood by those

20   skilled in the art, and status descriptions are discussed in further detail below.

Fig. 8 depicts a worklist screen from the perspective of the Account Team Collocation Coordinator (ATCC) of the ILEC. The profile associated with the individual utilizing the system determines the features available depending on whether the role assigned to the

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logged-in individual is a user, an ATCC, or a field group of the ILEC. The ATCC may view applications of all users and create an application, as shown by a creation area 126. Additionally, the dollar sign icon shown in action area 120 indicates an additional functionality that is only available to the ATCC of the ILEC. This additional functionality relates to billing and is used by the ILEC billing coordinator to document and monitor billing activity for each application Fig. 9 depicts a worklist screen from an ILEC field group perspective. Field groups cannot create applications or perform billing functions, but they may search and view applications for all users. Additional functionalities of the ILEC ATCC and field groups are discussed in further detail below.

Creation area 126, as shown in Fig. 7 (and also Fig. 8), is where all applications initially begin. To submit an initial application, the user selects an application and activity type, enters the CLLI code for the location where the equipment is to be installed, and selects "Create New." The ACNA field is automatically populated by the system with the ACNA associated with the user. If a paper application is sent to the ILEC, the ILEC creates an application in the same manner as a user does.

IV.   Creating, Revising, Editing, and Augmenting Collocation Applications

Once an application is created, a reference code is assigned and a first page of the application appears, as shown in Fig. 10. In an exemplary embodiment of the collocation application shown in Fig. 10, the first screen includes sections 1-3. The user selects tariff or contract and completes section 1, customer information. The user is prompted to enter the contract user's business name and address, ACNA, and contact information for a project

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manager. The system automatically populates any fields for which it already has data about the user, such as ACNA and address information.

Section 2 includes the wire center name, address, CLLI code, city, state, and zip code for the CO location where the user desires to install equipment. In an exemplary embodiment, if the user enters a CLLI code when creating the application, the system will supply the corresponding wire center name and address information to reduce errors and save the user time. Section 3 shows that the user has three choices regarding type of interconnection activity. However, only "Initial collocation installation" may be selected by the user when the activity type "Initial" is used to create a new application. In an exemplary embodiment, three activity types are available to the user: Initial, Augment, and Disconnect. These activity types correspond to the three selections available in the exemplary embodiment of section 3, as shown in Fig. 10. ILEC personnel may have available to them a fourth activity type, "Termination," which may be used when the ILEC is disconnecting equipment on behalf of a user based on extenuating circumstances (e.g., by order of a bankruptcy court). Once the required information in sections 1-3 is entered, this screen will prompt the user to stop the application if the user does not want to proceed with the location entered in section 2.

Sections 4 and 5 appear on a second screen of an exemplary embodiment of the collocation application. These sections are shown in Figs. 11 and 12. The user selects the type of space and enters the square footage. In an exemplary embodiment, when an Augment application is created, the user is provided with additional data input items for a caged or cageless non-conventional to allow the user to indicate requirements for additional space or space to be vacated. The user provides existing space detail plus information on the

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additional or vacated space. Optionally, the system may calculate and display the resulting space to reduce errors. If the user selects "Cageless Conventional" in section 4, the user then completes appropriate details in section 5A, 5B, or 5C. The user enters rack and spacer size. The system calculates the total width in column 6 and subtotals column 6 for all racks of

5 equal depth and enters that subtotal in column 7. This ensures that the calculations are accurate and saves the user time. Additional rows can be added to the table by selecting "Add Row," as shown in Fig. 11. Additional rows can also be added to the tables in sections 5B and 5C, as shown in Fig. 12.

Section 5B allows users to enter changes regarding the use of "Cageless Conventional" collocation space that has previously been assigned. In the case of a new

10 application, it is unnecessary for a user to complete this section. In the case of a previously submitted application, the user completes section 5B to indicate any requested changes. In section 5C, users provide information regarding all "Cageless Conventional" space that is to be released either by removal of existing equipment or releasing space previously reserved

15 for future use. It is unnecessary for the user to complete section 5C when creating a new application. Additionally, detailed instructions and, where applicable, examples of how to complete the tables in section 5 are available by clicking on the section (or subsection) title. This may be implemented for all sections of the collocation application, as shown in the exemplary embodiments in Figs. 10-26.

20 As shown in Fig. 13, users are requested to provide detailed information about the equipment to be installed (or removed, if equipment is to be removed) in section 6 of the application. The user may add tables if necessary. The exemplary embodiment shown in Fig. 13 requests numerous categories of information. In data item 1, users indicate the rack

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number as shown in a proposed floor plan layout that is (or will later be) attached to the application. In data item 2, users enter contact information for the vendor or manufacturer of the equipment. Users provide model numbers and functional descriptions for equipment in data items 3 and 4. In data item 5, users enter the existing quantity of equipment installed, and the quantity of equipment to be added or removed is entered in data item 6.

The total quantity in data item 7 is calculated and entered by the system, as is the total heat dissipation in data item 8. The "Total" portion of data item 8 reflects the heat release for all of the equipment across the line entry. The information for the "Per Unit" portion of data item 8 is provided by the user. Heat dissipation (HD) is directly proportional to the amount of power consumed by equipment. In data items 9 and 10, users enter the nominal and worst case -48V DC power requirements of the equipment on a per unit basis. The system calculates the total values. The system performs validation checks that verify whether the HD and the -48V DC nominal power entries in each equipment table fall within expected ranges (as defined below). If the one or more entries fall outside the expected ranges, an error message appears when the user attempts to submit the application. The message identifies the equipment table that fails the verification check. Upon receiving such a message, users should verify their entries with manufacturer's equipment specifications and correct any discrepancies.

In data item 11, users enter "yes" if the equipment meets the criteria level 1 requirements as outlined in the Telcordia Special Report SR-3580, Issue 1 for National Equipment Building Systems (NEBS) requirements, said document being incorporated herein by reference. Users enter "no" if the equipment does not meet these requirements. Users provide an attachment listing the non-compliant equipment and explaining the specific

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NEBS level 1 criteria that the equipment fails to meet. The system calculates the subtotals

for heat dissipation and nominal and worst case power requirements in the table shown above

the "Remarks" section in Fig. 13.

Section 7 is shown in Figs. 14 and 15. Although section 7 is shown in two figures,

5   section 7 is available to users on a single screen in an exemplary embodiment. In section 7,

users provide information on –48V Power requirements and grounding, as illustrated in Figs.

14 and 15. Sections 8 and 9 are shown in Figs. 16 and 17. Typically, these sections are

available to users on a single screen. Section 8 pertains to co-carrier cross connect detail,

such as how many cables are needed, to and from which cages will the cable run, what type

10   of service, and so on. Users complete section 8A if a connection between non-contiguous

collocation arrangements is being requested. If the user desires a co-carrier cross connect,

the user enters additional requested information regarding the equipment and equipment rack

location. Users complete section 8B if the installation requires fiber interconnection of the

user's non-contiguous racks or cabinets. As shown in Fig. 17, section 9 prompts users to

15   provide the quantity for each type of cable being installed and directs users as to which

portion of section 10 should be completed for the particular type of cable.

Sections 10 and 11 are shown in Figs. 18 and 19. Generally, in an exemplary

embodiment, these sections 10 and 11 are available to users on a single screen. Drop-down

menus in section 10 assist users with entering data related to the types of cable being used.

20   Users complete section 11 if shared space is involved.

Figs. 20 and 21 depict sections 12 and 13, which, in an exemplary embodiment, are

available to users on a single screen. In the portion of section 12 shown in Fig. 21, the user

selects the type of wiring requirement (such as DS-1, DS-3, etc.), type of connection, and

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whether the project is an addition or removal, as well as the desired quantity of each circuit. Drop-down menus assist users in providing this information. In the exemplary embodiment of section 13 shown in Fig. 21, users are prompted for contact information for equipment wiring, technical, local coordinator, and building access.

5   As shown in Fig. 22, the user supplies billing information in section 14. In section 15, the user certifies that the equipment listed in the application complies with several industry standards for safety and compatibility, as shown in Fig. 23. By selecting the Attachments link that is available at the top of most screens, as shown for example in Fig. 16, users may attach electronic files or documents to their applications, as shown in Fig. 24.

10   Users may add any comments about the attachment(s) in the box provided. Generally, users are prompted for a diagram of the space within which the equipment is to be located. The diagram may be sent as an attachment with the application, and the attachment remains linked to the application throughout its history, assisting in audit purposes.

         Once the user is ready to submit the application, the user selects "Submit," as shown in Fig. 24. At this time, the system performs a final check of the application to determine

15   whether any items are inconsistent, invalid, or otherwise incomplete. If there is a problem with any item, the system returns an error message indicating the source of the problem. As an example, in Fig. 25, the system advises the user that the certification checkbox in section 15 (shown in Fig. 23) is a required field that has not been completed. The user makes any

20   necessary corrections and selects "Submit" again to submit the application. If there are no inconsistencies or other incomplete items, the system generates a confirmation screen, including a time stamp, to indicate a successful submission, as shown in Fig. 26. Before submitting a completed application, the user may save the application as "unsubmitted."

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This is particularly useful if the user needs additional information to complete the application or needs to verify some information before submitting the application.

Once an initial application has been created, several functionalities are available to users to make changes or take other action with regard to the application. As discussed earlier in conjunction with Fig. 7, there is an action area 120 where users may edit, revise, or view applications or firm orders. "Edit" is available only for unsubmitted applications, which are applications that have been saved by the user but not yet submitted. The user selects "Edit" to continue working on the application. For submitted applications, "Revise" rather than "Edit" is available. When a user selects "Revise," a new version of the application is created. If a firm order for the application has been submitted, "View" allows the user to view, but not change, the application.

When a user selects "Revise," a new reference code is assigned as shown in Fig. 27. The reference code indicates that this is version "02" of the application. Additionally, a "save" option is no longer available among the main menu options shown at the top of the screen because an initial version of the application has previously been submitted. The user completes any revisions and submits the application. Other aspects of revising an application are generally the same or similar to entering information for and submitting an initial application. Version 01 of the application that was revised remains in the database but is marked superseded, providing an audit trail. The superseded applications are not viewed by users unless specifically requested and are kept primarily as historical records.

Referring to Fig. 7, for those applications where a Response to the application has been sent by the ILEC, a "Firm Order" link is available. The user selects the link to view the

firm order document. A firm order may not be revised. To place an order, the user completes and submits the firm order form.

Referring again to Fig. 7, a user may augment an existing equipment arrangement by selecting "Augment Ref Code." If "Augment Ref Code" is selected, the activity types available for selection are augment, disconnect, and termination, and the CLLI and ACNA are also entered. The user enters the reference code of the arrangement to be augmented prior to selecting the "Augment Ref Code" link. If the original application is available, it is provided as a basis for the augment application and the application type, CLLI, and ACNA of the augment application correspond to those of the original application. The assigned application number is the next available number for the CLLI and ACNA, regardless of the original application number, and the version number is preceded by an "A" to indicate that the application is for an augment. Fig. 28 shows an example of section 3 of an augment application. Under "Type of Interconnection Activity," the only choices offered are augment options.

Referring to Fig. 7, users may utilize "Create New from Ref Code" to create a new application that is based on an existing application. The user enters the reference code to be used as the basis for the new application and the CLLI code for the new application. The ACNA field is automatically populated by the system based on the user's profile. The user then selects "Create New from Ref Code" to create the new application. As shown in Fig. 29, a new reference code is generated using the CLLI code provided by the user and the next application number available for the CLLI and ACNA, and other information in the application is automatically populated based on the information in the previously existing application. Examples of sections 2 and 3 of a new application created in this manner are

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shown in Fig. 30. The user verifies that the requested location is correct in section 2 and selects the type of interconnection activity in section 3. Other aspects of completing the application are generally the same or similar to submitting an initial application created without reference to an existing application, as described above with reference to Figs. 10-26.

Once a collocation application is submitted by a user, the ILEC coordinator is notified by the system by e-mail or some other electronic means. The account team reviews the application for special contractual obligations that may exist between the user and the ILEC. Contractual obligations or other requirements are generally not validation or consistency checks performed by the system because contracts between the ILEC and each CLEC are constantly changing and being re-negotiated. The contract requirements for each CLEC may be implemented electronically, but this would require the implementation of complex and subjective business rules into the system, as well as additional personnel to enter the numerous updates.

The ATCC can revise the application as required, once the user has submitted the application. The system records that the changes were entered by the ATCC. After a complete review, if everything in the application is satisfactory, the ATCC changes the status of the application to "App Bona Fide." Overrides and special conditions may also be attached to an application by the ATCC. For an application status change, from status A to status B for example, a table provides for which field groups of the ILEC are to be notified of the status change. Several exemplary status descriptions include, but are not limited to, the options listed in Table 2:

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TABLE 2

STATUS	DESCRIPTION
Unsubmitted	Application has been saved but not submitted
App Received	Application has been submitted
App Bona Fide	Application is ready to be processed
Internal Hold	Application issues need to be clarified with user
Space Response	Space response has been sent
Response	Response sent to user
FO Received	Firm order received
FO Bona Fide	Ready for provisioning
Permit Hold	ILEC has applied for a building permit
Canceled	Application is canceled and no longer accessible
Space Ready	Space is available and waiting on acceptance by user
Space Accepted	Space has been accepted by user

An exemplary status area 124, as shown in Figs. 7-9, provides the current status of the application and the date of the most recent status change for the application. An ILEC may select the current status on the worklist to update an application status. CLECs rely on this status information to monitor application activity. A screen detailing the application status history, as shown in Fig. 31, appears when the user selects the status link. In an alternate embodiment, the status history feature may only be available to the ILEC. A log of the application history appears at the bottom of the screen, from oldest to newest entry. Most

10   status changes are made in a logical order. As an example, the ILEC is not allowed to change "App Bona Fide" to "FO Bona Fide." An error message appears, indicating that the change is invalid and listing the steps that have not yet been completed for the application. When placing an application on "Internal Hold," the ILEC must provide a comment to explain the reason. A comment is also required to explain the reason for removal of the

15   "Internal Hold" (e.g., what corrections or remedial actions have been performed).

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V. Processing of Collocation Applications

Once an application enters the App Bona Fide status (i.e., a space response or response is being prepared by the ILEC), a workbook is created. The workbook is a valuable tool for users and for the ILEC. The individual profile role is used to determine what system features are available to each field group of the ILEC. For example, each ILEC field group may be able to view all sections of the workbook but only be allowed to save or submit information related to that field group's particular function. Fig. 32 depicts an exemplary workbook summary screen for a collocation application, in this example, reference code BWLGKYMA-PA-ACA-100-01. The workbook summary provides the ILEC field groups with the ability to quickly determine whether they need to provide a response to the application. The workbook summary checkmarks are activated based on the details provided in the application using a fixed set of business rules. This feature saves a significant amount of time for the ILEC field groups since they now will only review applications that require a response from their functional area. There are numerous menu links to additional sections or pages of the workbook across the top of the screen, as shown in Fig. 32. Selecting "Application" takes the field group directly to the application to obtain any necessary information needed to complete a workbook section. Selecting "Attachments" allows for the addition and/or deletion of attachments to and/or from the workbook. A file may be attached by selecting "Attach File," as shown in Fig. 33.

An exemplary Reference section is shown in Figs. 34 and 35. After changing the status of the application to "App Bona Fide," the Common Systems Capacity Management (CSCM) group selects the contract type from the drop-down menu, as shown in Fig. 34. The

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billing account number and zone are completed if necessary, and the ILEC selects "Submit" to submit the completed Reference page. As shown in Fig. 35, the Reference page contains contact information for ATCCs and collocation project coordinators. The Reference page may also display status information for associated collocation application reference numbers.

5   An exemplary Space Availability section is shown in Fig. 36. The CSCM group enters the space response information. Notification of the applicable field groups is triggered once the CSCM group submits the completed page. The ATCC sends the response to the CLEC and updates the status of the application to "Space Response" to reflect that the space response has been sent to the CLEC. If the space response is other than as requested by the CLEC, then comments may be included. In certain instances, there may not be any space available at the desired CO location. If this is the case, the status of the application is changed to an "Internal Hold" status.

Figs. 37-39 are exemplary screen shots of a Customer Inquiry Response (CIR). In an exemplary embodiment, the CIR generally appears on a single screen. The CIR is the detailed response to the customer or user. It is a compilation of the individual responses from the ILEC field groups and contains the cost estimate for the work to provide the user with the requested collocation space. A user or CLEC may view the CIR page while the application is in the Response status.

The application workbook also contains sections for applicable field groups. Links to these sections are provided at the top of the workbook Reference screen, as shown in Fig. 32.
20   As examples, Figs. 40-43 show workbook pages for several ILEC field groups. Fig. 40 shows an exemplary workbook section for the Power Capacity Management (PCM), Fig. 41 shows an exemplary workbook section for CO-Operations, Fig. 42 shows an exemplary

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workbook section for the Interconnection Network Access Coordinator (INAC); and Fig. 43

shows an exemplary workbook section for the Circuit Capacity Management (CCM) field

group. Other field groups shown in Fig. 32 include Corporate Real Estate and Services

(CRE&S), CSCM, Outside Plant Engineering (OSPE), Service Quality Measurement (SQM),

5   and Connecting Facility Assignment (CFA). Exemplary screen shots are not shown for these

additional field groups, but exemplary sections would contain information tailored to the

specific group and would be generally similar to those shown in Figs. 40-43. Each field

group responds to its own page, and the pages are customized based on the contract type.

Additionally, some data fields are automatically populated by the system, based on

10   information from other sections or provided by the user when completing the application,

and may not be edited. As each field group submits its page, the INAC is notified. Once all

of the applicable field groups complete their respective section, the INAC completes and

submits the INAC page, an exemplary embodiment of which is shown in Fig. 44.

The ATCC reviews the CIR, shown above in Figs. 37-39, and sends it to the user.

15   The ATCC is notified once the INAC workbook section is complete. The CIR is customized

by contract type and once it is sent, the status of the application is changed to "Response" to

reflect that the CIR has been sent to the user. If the ATCC approves, the CIR is sent to the

CLEC and the date and time of transmission are recorded. The ILEC may select the "Critical

Dates" page, as shown in Fig. 45, from the workbook to view the critical dates for certain

20   tasks related to the collocation application. The field for the last date updated and status flag

for each section of the workbook is populated as shown at the bottom of Fig. 45.

Once the CIR is sent to the CLEC, the CLEC must submit a firm order within a

predetermined period of time, based on federal regulations and/or contractual obligations. If

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the CLEC fails to do so, the status of the application is changed to "Expired," the application

is removed from the worklist, and notification is sent internally (at the ILEC) to release the

allocated space. If the CLEC submits a firm order, the status of the application is changed to

"FO Received" to reflect this and provisioning begins among the ILEC field groups to

5   prepare the collocation space once the firm order is reviewed and verified as complete (status

changes to "FO Bona Fide"). Fig. 46 is an exemplary Firm Order form where the user

provides any requested information and submits a firm order for the application.

An exemplary billing screen, as shown in Figs. 47 and 48, may be accessed by

selecting the dollar sign icon in the action area of the worklist page, as shown in Fig. 8 and

10   discussed briefly above. The billing page is only available to ILEC personnel. The

exemplary embodiment shown in Figs. 47 and 48 is divided into four sections: general

information, application billing information, firm order billing information, and remarks.

Once the firm order is bona fide, provisioning begins. The ILEC records dates such

as completion of build out, customer review of space, and customer acceptance of space.

15   Once the customer accepts the collocation space and the project is completed, a true-up

phase begins. This is a reconciliation phase, but no billing is actually done by the ILEC.

Figs. 49-51 show exemplary Firm Order True-Up screens. At this stage, the ILEC is

providing the user with final data regarding costs and other details so that billing can begin.

20   VI.   Management of Collocation Applications, including Administrative Notification and

Due Date and Event Date Management

The system notifies the various ILEC functional or field groups via e-mail or some

other electronic means of numerous key events as a collocation application progresses

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through the process from start ("App Received") to finish ("Request Complete"). An extensive set of database tables is utilized to provide a flexible yet easily maintained process.

The foundation of the notification process is the geographically-based areas composed of one or more CLLI codes, which may be referred to as "Notification Areas". A CLLI can be included in any number of areas. Therefore, a Notification Area for a state is composed of all CLLIs within the geographic boundary of the state. A sub-state "Notification Area" can contain any number of CLLIs including CLLIs from adjoining states to reflect cross-boundary ILEC field groups. This allows each field group within an area to describe its geographic boundaries uniquely and separately from all other field groups. For each field group, all CLLIs within an area are assigned to a uniquely named grouping. After the Notification Area(s) for a field group are defined, the members of that field group may be associated with that Notification Area(s) in the individual profile for each field group member that utilizes the system.

As shown in Fig. 52, the Customer/Company Profile Maintenance screen is available to system administrators from the administrator menu screen. Profile maintenance options include maintenance of both company and individual user (including CLEC users and ILEC field groups, administrators, or other ILEC personnel) profiles, as shown in Fig. 53. Before an application can be submitted, a record for both the company or CLEC and the individual must be added to the system. An exemplary embodiment of a company profile maintenance screen is shown in Fig. 54. An exemplary embodiment of a individual profile maintenance screen is shown in Figs. 55-57, and although shown in multiple figures, is typically viewable on a single screen.

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As shown in Fig. 56, users, administrators, and ILEC field group members using the system are assigned to a group, including, but not limited to, for example, ATCC, Billing, CCG, CCM, CLEC, CO, Collections, CRE&S, CSCM, INAC, and Legal. The group or role to which the individual is assigned defines the features of the system that are available to that

5   individual. An individual may be associated with one or more Notification Areas. For example, if a user was to be associated with Florida and Georgia, then those two states would be selected in the notification area panel. As shown in Fig. 55, three Notification Areas (South Carolina, AL CO-BRHM, and AL CO-HNVL) are visible in the selection panel. An unlimited number of Notification Areas can be defined in the system. Some individuals will

10 require a custom Notification Area. The system has the capability to associate a CLLI list in addition to a Notification Area with any individual. The portion of the screen shown in Fig. 57 provides an example of how seven CO CLLIs may be associated with an individual.

The notification process is event driven by a change in application status or other specific event. When an event occurs, a custom notification is generated by the system and

15 distributed based on the notification rules. Each defined event is associated with one or more groups or roles. The system identifies a "Notification Group," comprising all users associated with that particular role and who are also associated with a Notification Area or CLLI for the application that generated the event. All members of the Notification Group receive the email notification that identifies the application by reference number and the

20 event that occurred along with any other information that is significant to the event. Exemplary embodiments of such a notification process and system include an Internet-based email process that provides for either internal ILEC notification, external notification of vendors and suppliers, or both.

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Workflow management functions of the system are centered around a process which may be referred to as "Critical Date Management." In this context, both due dates and event dates are considered part of the Critical Date Management process. Due dates for a collocation application are based on event intervals as defined by federal and/or state

5   regulatory bodies. Collocation application event intervals are based on a number of characteristics of the application space, including, but not limited to, application type (physical or virtual), space type (caged or cageless), and activity type (initial or augment). An exemplary embodiment may utilize a table-based lookup to provide the flexibility needed to define all of the possible parameters of the due date intervals. The due dates for any

10   individual application are primarily determined when the application status is set to App Bona Fide and then FO Bona Fide. Accordingly, the application status section is significant for the Critical Date Management process, as is the critical dates section.

Exemplary embodiments of application status screens are shown in Figs. 31, 58, and 59. The application status screen may be accessed from the worklist by selecting the status

15   for the application. In an exemplary embodiment, only ILEC field groups or other ILEC personnel may access this screen. The ATCC, as the customer or user contact group, has primary responsibility with regard to changing the status of an application. Some of the exemplary status options are visible in Fig. 58.

The event date for the status change is the date on which the status of the application

20   is updated. In some cases, the application status is not actually changed on the event date. One example of this is where a number of applications are submitted at the end of the day and all of them are not reviewed before the close of business on that day. Once the unexamined applications are reviewed the following business day and determined to be valid

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and accurate, then the status of the applications is set to App Bona Fide effective the date of receipt, not the date of the review, of the applications. The ILEC accesses the application status screen for such an application and indicates that a date override is needed.

In our example above, the date override function is used to change the App Bona Fide status date to the date the application was received. Generally, the ILEC may not enter any override date that is earlier than the App Received date. The ILEC enters an override reason and a comment (e.g., application received at the end of the day and could not be processed on the received date), as shown in Fig. 59. The date override capability allows the system to accurately capture the event with sufficient specificity to document the significant details for reporting and management. The status history section, as shown in Figs. 58 and 59, captures all event dates, making it possible to quickly determine when changes were made and who made the changes to the application status.

The critical dates section is another significant section with regard to the Critical Date Management process. Exemplary embodiments of critical dates screens are shown in Figs. 45, 60, and 61. The critical dates screen is accessed from the worklist by selecting the reference code of an application. In an exemplary embodiment, only ILEC field groups or other ILEC personnel may access this screen. The Program Manager (PM) group has primary responsibility as the collocation coordinator group for monitoring and as needed updates to the due dates of an application.

As shown in Fig. 60, a complete history of the dates for the selected application may be obtained from the critical dates screen. All appropriate dates for the application type, including the due dates and event dates, are shown in Fig. 60. Also included are the interval days, interval day type (e.g., calendar or business), and the interval indicator. The interval

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indicator shows whether the "Regulatory Space Ready Due Date" is based on the App Bona Fide (AB) or FO Bona Fide (FO) event date. For event dates, the system calculates the actual interval days based on the business rules used to determine the corresponding due date. Using this approach ensures that a valid comparison can be made across all applications for statistical analysis and for reporting to regulatory bodies.

As with event dates, situations arise where due dates need to be updated to take into consideration unforeseen changes to business rules. A common example of this is where a regulatory body issues a retroactive ruling. Such a ruling requires changes to the system interval tables in order to show an effective date in the past. After the system interval table has been updated, all impacted applications are manually updated to reflect the new due dates. Due to the critical nature of the work involved, a manual process is preferable to a mechanized implementation in order to effect such retroactive changes. As shown in Fig. 61, due date labels may be selected to allow the selected date to be updated. When a date is selected, the appropriate update screen is displayed. Fig. 62 illustrates an exemplary embodiment of a "Regulatory Space Ready Due Date" update screen. If a different interval was in effect for the exemplary embodiment shown, the different interval would be populated in the "New" column. For those situations where an update needs to be made before the system tables are updated, this screen allows direct input of the "New" values for the interval days and interval day type, as well as the interval indicator if necessary. The ability to adjust event dates and update due dates ensures that the data in the system has the necessary level of accuracy to satisfy reporting requirements.

A standard Query and Reporting tool is used to access the extensive detail available from the system database. This allows managers to track completion of work to ensure that

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due dates are realized. It also allows summary reporting to analyze critical date management results by ILEC group, geography, CLEC, etc. The availability of these analytical reports from a tool, such as Microsoft Access®, Oracle® Discoverer™, or similar tools, provides critical information needed to manage the application process and to respond to information inquiries from management and regulatory bodies.

The foregoing description of the exemplary embodiments of the invention has been presented only for the purposes of illustration and description and is not intended to be exhaustive or to limit the invention to the precise forms disclosed. Many modifications and variations are possible in light of the above teaching.

The embodiments were chosen and described in order to explain the principles of the invention and their practical application so as to enable others skilled in the art to utilize the invention and various embodiments and with various modifications as are suited to the particular use contemplated. Alternative embodiments will become apparent to those skilled in the art to which the present invention pertains without departing from its spirit and scope. Accordingly, the scope of the present invention is defined by the appended claims rather than the foregoing description and the exemplary embodiments described therein.